REMARKS

In the official action dated February 9, 2005, claim 1 was rejected as unpatentable over Modak (US 6,537,913) in view of Liu (US 6,211,085) and claims 2-6 were rejected as unpatentable over Modak and Liu in view of Huang et al. (US 5,527,736). In view of the forgoing amendments and the following remarks, the rejections are respectfully traversed and reconsideration of this application is respectfully requested.

Independent claim 1 recites a method for forming a contact of a semiconductor device having a Cu line using a dual damascene process. The method includes an etching operation for forming a tungsten plug that occupies a lower part of the tungsten layer in a trench portion and a contact hole portion. During the etching operation, only an upper part of the tungsten layer in the trench portion is etched so that a void in the contact hole portion is not exposed.

Modak discloses a method for making a semiconductor device that includes copper interconnect pads having aluminum caps. Liu discloses a copper damascene structure that protects an upper copper surface. However, neither Modak nor Liu discloses or suggests a method for forming a contact using a Cu line in a semiconductor comprising etching an upper part of a tungsten layer in a trench portion so as to not expose a void in a contact hole portion, as recited in claim 1.

It is well known that the growth of the tungsten layer from sidewalls of the contact hole during the CVD process can form a void in the middle of the contact hole. Further, the void can be exposed after a tungsten CMP process or a touch-up process. When the void is exposed, a Cu diffusion barrier cannot be properly formed over the void. As a result, copper in a Cu line is diffused into a silicon substrate via the tungsten diffusion barrier.

However, as recited in the method of claim 1, only the upper part of the tungsten layer in the trench portion is etched and, as a result, any void in the contact hole portion is not exposed by the etching operation. Thus, a Cu diffusion barrier can be appropriately deposited on the entire surface of the tungsten plug, thereby preventing copper from being diffused into the silicon substrate.

For at least the forgoing reasons, it is respectfully submitted that claims 1-6 are in condition for allowance. If, for any reason, the examiner is unable to allow the application in the next official action, the examiner is encouraged to telephone the undersigned attorney at the telephone number listed below.

Respectfully submitted,

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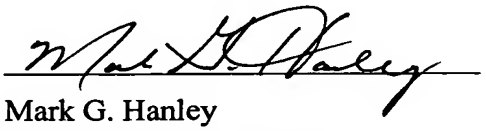

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